WASHINGTON
SCIENCE TRENDS

HIGHLIGHTS

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Vol. IV No. 14 June 20, 1960

R & D T R E N D S

* SYNTHETIC MICA

U. S. Bureau of Mines believes it has developed a method of forming flakes of synthetic mica into thin sheets that may prove superior to natural mica for certain uses in electronics. Sheets are said to be strong and flexible, with high dielectric strength. Applications are said to include capacitors, tube spacers and other components.

Tests at the Bureau's Norris, Tenn. Research Center reportedly indicate that synthetic mica sheets will retain their properties in a high temperature environment which would cause failure with natural mica.

Flakes are obtained by crystallizing a melted mixture of feldspar, sand, magnesia, lithium floride and other minerals. The flakes absorb water rapidly, which is an advantage in forming them into sheets. However, this also causes the paper to soak up moisture when stored, thus lowering dielectric strength. Bureau researchers are optimistic that this difficulty can be overcome through a cooperative program with the General Telephone and Electronic Laboratories, Inc., Flushing, L. I., N. Y.

* CORONENE RECOVERY

The rare chemical coronene can be produced during the conversion of certain American coals to pipeline gas, according to new studies by the U. S. Department of the Interior. Coronene, used as a base for dyes, has never been employed commercially in the United States. Its formation was discovered while testing powdered Pennsylvania anthracite for production of pipeline gas.

Officials said recovery was at the rate of one pound per 1,000 pounds of coal -- a prohibitive figure unless the production of pipeline gas from anthracite becomes commercially feasible with coronene as a byproduct. The coronene recovered is said to be extremely pure and is described technically as a hydrocarbon consisting of a ring, or crown, of six benzene rings. Researchers stated that it has an exceptionally high melting point for a hydrocarbon, is quite stable, and relatively inert.

* MICRO-REPRODUCTION

Armed Services are consolidating requirements for micro-reproduction of engineering drawings, associated lists and related data. Nine new documents replace about 50 separate ways of doing business with each service. Information includes how to make microfilms; how to prepare tabulating cards, aperture cards and negatives for engineering documentation; standard methods for data presentation and similar material. (For details write Commander, Wright-Patterson AFB, ATTN: EWBFE, Dayton, Ohio)

"THROW-AWAY" MODULES FOR ELECTRONIC EQUIPMENT

A National Bureau of Standards study team has outlined for the Navy a system of expendable modules as bases for disposal-at-failure maintenance for electronic equipment.

Here, for reference and planning, is an outline of their findings:

* Advantages

ø Improved Reliability -- New weapon systems bring more severe environmental problems. Expendable modules embedded in plastic or sealed hermetically might improve reliability considerably. In addition, such components as printed circuits, resistors, transistors could no longer be damaged during repair. And replacement parts would be equal in quality to original.

ø Improved Systems Maintenance -- Training of military technicians for repair work could be considerably reduced and more time could be spent on instruction on the operation and maintenance of electronic systems. In the field, their time would also be spent on operation and maintenance rather than repair.

ø Reduction in Spare Parts -- A "drastic" reduction in the number of spare parts would be anticipated. A typical repairable four-tube module, for example, contains some 40 different parts. These would be replaced by a single spare module.

ø Reduction in Specifications -- A specification is currently required for each part in an assembly. A single module might require a single specification.

ø Better Storage Possibilities -- Modules would take less room than conventional spare parts. If embedded or hermetically sealed they would require little or no storage protection.

ø Emergency Conditions -- Under wartime conditions assemblies that are planned for repair are often thrown away when they become defective. This disrupts the planned maintenance program.

* Disadvantages

ø Decline of Technical Skills in the Military -- Technicians might become deprived of valuable repair experience. However, these technicians could put their time and training to better use in learning operation and fault location.

ø Increased Supply Burden -- Spare modules would always have to be available because most expendable modules would be designed so that repair would be difficult or impossible. However, the easing of conventional spare part burdens should permit adequate supplies of expendable modules.

ø Reduction in Failure Data -- It would not be possible to obtain failure data on the parts in expendable modules from the field. However, there are several ways in which field failure data for the modules themselves could be obtained.

ø Excessive Cost -- The NBS studies do not indicate that this would apply. It is estimated that an equipment type built with four to eight tube modules would cost about the same to procure, support and maintain as would a similar unit built with repairable modules.

(Report Available, 79 Pages. $2.25. Write OTS, U. S. Department of Commerce, Washington 25, D. C. for NBS Tech Note 41)

ROYALTY-FREE PATENT CHECKLIST

Here is a new listing of Government-owned patents now available for use by industry on a royalty-free basis. Subscribers desiring further information may write Service Department, Washington SCIENCE TRENDS, 1120 National Press Bldg., Washington 4, D. C.

You will be furnished with the patent number and classification, and information on where to obtain the patent, and where to apply for licensing.

( ) ACOUSTIC TESTING INSTRUMENT: This instrument is said to be useful for measuring the characteristics of paper, leather and textiles. Two fabric samples rub together and the vibration is converted to sound and then into an electrical signal.

( ) AIRCRAFT RADAR IDENTIFICATION: With this system one arm of an aircraft propeller is coated with a fine dispersion of electrically conducting particles in an insulating binder. The coating absorbs incident microwave radiation of a pre-selected wavelength, making it possible to identify the aircraft by radar.

( ) DELAYED ACTION BATTERY: This battery consists of a liquid electrolyte, a metal anode, a cathode and the means for exposing the anode and cathode to the electrolyte. A coating layer is removable from the cathode by the electrolyte after the passage of a selected period of time, for activating the battery.

( ) FLUID VALVE: A high flow rate with very low pressure drop is said to be provided by this device. A solenoid-operated balanced valve is arranged so that the air gap between the solenoid core and the moving plunger is less than the total travel of the piston -- thus minimizing power requirements.

( ) HYDROPHONE CALIBRATOR: Gas serves as a conducting medium in this device which is used for verifying the status of calibration of a previously calibrated underwater hydrophone. This is said to be superior to the liquid generally used in such devices.

( ) MAGNETICALLY SUPPORTED GYROSCOPE: This patent covers a system said to be capable of maintaining a body of properly selected material suspended in a vacuum. It can then be set in rotation about an axis and can determine the orientation of the observer in relation to the axis of rotation. The system can be used as a gyroscope, or as an accelerometer to determine components of acceleration along each of three axes of support.

( ) GLASS FIBER STRUCTURES: With this process a structural member made of a concrete base and bonded glass reinforcing members is strengthened by pre-stressing the glass fibers. A self-hardening resin impregnates and binds the glass fibers into a consolidated mass. The resin coating on the fibers is covered by water settable powdered Portland Cement primer.

( ) AIRBORNE PARTICLE COUNTER: This system is said to detect, measure and count particulate matter in an aerosol. Photo-electric devices are used.

PUBLICATION CHECKLIST

( ) SMALL BUSINESS POOLS, an official guide to "pooling" arrangements under which small business firms may join together to undertake defense contracts or Government-sponsored research and development programs that would be beyond their individual capabilities. 24 Pages. Single Copies Free. (Subscribers may write Washington SCIENCE TRENDS, 1120 National Press Bldg., Washington 4, D. C., Attn: Service Dept.)

( ) TELEMETRY SYSTEM DESIGN, a basic description of some of the main factors involved in the design of a telemetry system for satellites, space probes, communications relays, etc. Tables and graphs permit each element of such a system to be considered separately, and as part of an overall system. 11 Pages. Single Copies Free. (Write National Aeronautics and Space Administration, 1520 H Street, N. W., Washington 25, D. C., ATTN: CODE BID for NASA TN D-355)

( ) ELECTRON TUBES AND SEMICONDUCTOR DEVICES, DIODE, a brief listing of electron tubes used by the Army, Navy and Air Force in the design and manufacture of electronic equipments. Includes requirements for the application and utilization of electron tubes. 14 Pages. 25 Cents. (Write Superintendent of Documents, Government Printing Office, Washington 25, D. C. for MIL-STD-200E)

( ) HIGH-SPEED CAMERA STUDIES, a Government report on the use of photographic equipment exposing sensitive film at speeds up to 3,200 frames per second in connection with blasting studies. Describes equipment employed and provides instructions on its use. 32 Pages. Single Copies Free. (Write Publications Distribution Section, U. S. Bureau of Mines, 4800 Forbes Avenue, Pittsburgh 13, Pa. for Report of Investigation No. 5584)

( ) LOG OF THE TRITON, the daily log of the nuclear submarine which circumnavigated the world underwater from February 16 to May 2, 1960. 80 Pages. 45 Cents. (Write Superintendent of Documents, Government Printing Office, Washington 25, D. C. for Pub. D 201.2:T 73)

( ) SELECTED ASPECTS OF MILITARY PROCUREMENT, a Congressional committee which investigated the Navy's procurement of airborne rocket launchers attempts to discover the results of their studies. 62 Pages. Single Copies Free. (Write Committee on Government Operations, U. S. House of Representatives, Washington 25, D. C. for House Report No. 1627)

( ) STRATEGIC STOCKPILE, a Congressional report on strategic and critical materials inventories of the U. S. Government as of April 1960. 14 Pages. Single Copies Free. (Write Joint Committee on Reduction of Nonessential Federal Expenditures, The Capitol, Washington 25, D. C. for Senate Committee Print No. 5)

( ) TRITIUM, a review of the biological research possibilities of this radioactive isotope. Discusses methods of tritium-counting, tritium labeling and tritium applications, including safety precautions. 56 Pages. $1. (Write Publications Sales Unit, International Atomic Energy Agency, Vienna 1, Austria)

DEPARTMENT OF THE AIR FORCE

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Subject	Contact
Environmental Control Branch (WCLEMA)	
Air conditioning: ground air-cooling and heating equipment	Mr. F. R. Ebersbach Ext. 20214 or 25184
Ground Support Equipment Division (WCLERCC)	
Checkout equipment, electronic: integrated test equipment, automatic programmer-comparator equipment applicable to automatic checkout of weapon systems and automatic countdown and launch control of missiles	Mr. F. Micka, Ext. 25214 or 34243
Application Engineering Branch (WCLEPE)	
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Ground Support Equipment Division (WCLERSM)	
Hydraulic power: systems and components, hydraulic test sets; fluid servicing equipment	Mr. J. W. Parker Ext. 26222 or 37208
Ground Support Equipment Division (WCLERCA)	
Support equipment, ground: propelled and towable cargo- and/or components-handling transportation equipment; access and maintenance stands, preventative and protective maintenance equipment; liquid and gaseous generative, transporting and dispensing servicing equipment; base equipment including portable shelters, airport fire-prevention and -fighting facilities, snow plows and runway sweepers and illuminating facilities	Mr. E. M. Kaminski Ext. 25109 or 33187
Material Research Area	
Lubricants and hydraulic equipment: polymers, rubbers, plastics; textiles, metals, protective coatings and cleaners	Lt. Col. H. E. Hamlin, Ext. 36251

DEPARTMENT OF THE NAVY

Office of the Chief of Naval Operations
Main Navy Building
Washington 25, D. C.

Bureau of Naval Weapons

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Bureau of Ships

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Automotive vehicles, general types (Code 632)	Mr. V. M. Remigailo Ext. 65474
Bearings, all types	Engineering Experiment Station Annapolis, Maryland Telephone: COlonial 3-2611 Mr. Watt Smith Ext. 1437

Bureau of Yards and Docks

	Telephone: OXford (plus extension)
Automotive vehicles, general types (Code D-230)	Mr. R. H. Welles Ext. 77334
Ship Missile Program Division	Naval Air Engineering Facility (S1) Philadelphia, Pennsylvania Telephone: HOward 5-1000 Mr. A. Kowalezyk Ext. 3833
Weapons Division (Code EL-12)	Naval Air Development Center Johnsville, Pennsylvania Telephone: OSborne 5-7000 Mr. G. Duval Ext. 215 or 452

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